

**In the Claims**

1           1. (Previously Presented) A method of cooling a low Z target material of a neutron source  
2 assembly, comprising:  
3           providing, by using a nozzle submerged in liquid gallium, a submerged jet of  
4 concentrated liquid gallium in a direction normal to a non-bombarded surface of the low Z target  
5 material within the neutron source assembly to cool the low Z target material;  
6           providing a reservoir of liquid gallium; and  
7           pumping the liquid gallium, serially, from the reservoir, through the nozzle, such that the  
8 liquid gallium impinges upon the low Z target material in the neutron source assembly and cools  
9 the target material, from the neutron source assembly directly to a heat exchanger to remove heat  
10 from the liquid gallium, and from the heat exchanger to the reservoir.

1           **Claims 2-3 (Cancelled)**

1           4. (Previously Presented) The method of claim 1, wherein the target material comprises  
2 beryllium.

1           5. (Previously Presented) A neutron source assembly having a liquid cooled target,  
2 comprising:  
3           an accelerator based neutron source including a low Z target material that is bombarded  
4 by accelerated particles to produce a neutron flux; and  
5           a cooling system to circulate liquid gallium through said accelerator based neutron source  
6 to cool the low Z target material;  
7           said cooling system including a nozzle, said nozzle being submerged in liquid gallium,  
8 providing a submerged jet of concentrated liquid gallium in a direction normal to a non-  
9 bombarded surface of the low Z target material within the accelerator based neutron source;  
10          said cooling system further including,  
11              a reservoir of liquid gallium;  
12              a heat exchanger, and

means for serially circulating said liquid gallium from said reservoir through said nozzle to impinge upon said surface of the low Z target material within said accelerator based neutron source, from said accelerator based neutron source directly to said heat exchanger, and from said heat exchanger to said reservoir.

**Claim 6 (Cancelled)**

7. (Previously Presented) The neutron source assembly of claim 5, wherein said means for circulating comprises a pump.

8. (Previously Presented) A liquid cooling system for a neutron source assembly, said cooling system comprising:

a reservoir of liquid gallium;

a heat exchanger;

a nozzle, said nozzle being submerged in liquid gallium, providing a submerged jet of concentrated liquid gallium in a direction normal to a non-bombarded surface of a low Z target material within the neutron source assembly; and

means for serially circulating said liquid gallium from said reservoir through said nozzle to impinge upon said surface of the low Z target material within the neutron source assembly, from the neutron source assembly directly to said heat exchanger, and from said heat exchanger to said reservoir.